UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,200	09/11/2003	Gary C. Vanstone	EM-1991	9114

5179 7590 03/29/2006

PEACOCK MYERS, P.C.
201 THIRD STREET, N.W.
SUITE 1340
ALBUQUERQUE, NM 87102

EXAMINER	
NGUYEN, THONG Q	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 03/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/662,200	VANSTONE ET AL.	
	Examiner	Art Unit	
	Thong Q. Nguyen	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-13 and 15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-13 and 15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The present Office action is made in response to the amendment filed on Jan. 17, 2006. It is noted that in the amendment, applicant has amended claims 1, 11 and 19. There is not any claimed being added or canceled from the application. The pending claims 1-3, 5-13 and 15-20 are examined in this Office action. Note that claims 4 and 14 were canceled by the applicant in the amendment of March 3, 2005.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required.

The specification does not provide a proper antecedent basis for the feature that the tertiary mirror has its focal point located off the optical axis as recited in each of claims 1 and 19.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-3, 5-13 and 15-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably

convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

a) Claim 1 is rejected under 35 USC 112, first paragraph because the disclosure, as originally filed, does not provide support for the three mirror off-axis anastigmatic optic and the position of the focal point of the tertiary mirror with respect to the so-called "the optical axis" as now claimed. In particular, while the disclosure, as originally filed, discloses a three mirror anastigmatic optic; however, the disclosure has never disclosed that the three mirror anastigmatic optic is an off-axis system and the formation of the position of the focal point of the tertiary mirror with respect to the so-called "the optical axis" as are now claimed.

Regarding to the applicant's arguments that the feature related to the "off-axis" feature of the three mirror anastigmatic optic is supported from the figures 1-3 in which the tertiary mirror has a focal point which lies off the so-called "the optical axis". See amendment, page 5, lines 3-10. The Examiner respectively disagrees with the applicant's opinions.

First, while the figures 1-3 show that the focal point of the tertiary mirror is off respectively to the alignment axis (20); however, the specification has never disclosed that the three mirror anastigmatic optic is an off-axis system, and the specification has never referred to disclosed an optical axis. The only feature disclosed in the specification is related to an alignment axis (20), see page 2, line 8; page 3, lines 18-19; and page 4, lines 5-6, 12, 17 and 22. In page 2, on line

11-13, the specification discloses an optical path which is a light path defined by the tertiary mirror. Applicant is respectfully invited to review the specification in pages 2-5 which has never disclosed any information related to the so-called "the optical axis".

Second, applicant has stated that since the focal point of the tertiary mirror lies off the so-called "the optical axis" thus the three mirror of the invention is a three mirror off-axis anastigmatic optic. The Examiner respectfully disagrees with the applicant's viewpoints. The examiner is of opinion that the position of the focal point of a tertiary mirror respect to the so-called 'the optical axis" of a three mirror system does not mean that the system is an off-axis system. The support for that conclusion is found in the U.S. Patent Nos. 4,632,521 and 4,101,195. For instance, in the Patent 4,632,521, the three mirror anastigmatic system comprises three mirrors (14, 22 and 26) which each mirror is an off-axis mirror; however, the focal point of the tertiary mirror (26) is located on the optical axis (12) of the system having the three mirrors. In the Patent 4,101,195, the focal point of the tertiary mirror is located off-axis of the optical axis of the system; however, the three mirror anastigmatic system is a three mirror on-axis anastigmatic system. Thus, applicant's opinion that since the focal point of the tertiary mirror is located on an off-axis with respect to the optical axis and thus the three mirror system is a three mirror off-axis system is not proper and is not supported by the disclosure, as originally filed.

b) Each of claims 11 and 19 is rejected for the similar reason as set forth in element a) above.

In particular, each of claims 11 and 19 is rejected under 35 USC 112, first paragraph because the disclosure, as originally filed, does not provide support for the three mirror off-axis anastigmatic optic and the position of the focal point of the tertiary mirror with respect to the so-called "the optical axis" as now claimed. In particular, while the disclosure, as originally filed, discloses a three mirror anastigmatic optic; however, the disclosure has never disclosed that the three mirror anastigmatic optic is an off-axis system as is now claimed.

c) The remaining claims are dependent upon the rejected base claims and thus inherit the deficiencies thereof.

5. Claims 11-13 and 15-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

a) Claim 11 is rejected under 35 USC 112, first paragraph because the disclosure, as originally field, does not provide support for the feature thereof "adjusting the mirrors such that...the secondary mirror" as recited in the newly-added material to the claim.

Applicant is respectfully invited to review the specification, pages 2-5. It is noted that while the specification discloses that the optic has tilt coincident to the

common alignment axis, see pages 3-4 and the secondary mirror is tilted and moved for the purpose of focusing, see page 2, lines 11-13; page 3, lines 19-21; page 5, lines 4-9 and 22. The specification has never disclosed that all mirrors are adjusted to cause electromagnetic wave reflected from the tertiary mirror travels to a position near but not on the secondary mirror as claimed.

b) Claim 19 is rejected under 35 USC 112, first paragraph because the disclosure, as originally field, does not provide support for the feature thereof "adjusting the mirrors such that...off the optical axis" as recited in the newly-added material to the claim.

Applicant is respectfully invited to review the specification, pages 2-5. It is noted that while the specification discloses that the optic has tilt coincident to the common alignment axis, see pages 3-4 and the secondary mirror is tilted and moved for the purpose of focusing, see page 2, lines 11-13; page 3, lines 19-21; page 5, lines 4-9 and 22. The specification has never disclosed that all mirrors are adjusted to cause the focal point of the tertiary mirror off the so-called "the optical axis" as claimed.

c) The remaining claims are dependent upon the rejected base claims and thus inherit the deficiencies thereof.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-3, 5-10 and 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a) Claim 1 is rejected under 35 USC 112, second paragraph because the feature "the optical axis" (line 4) lacks a proper antecedent basis. Further, it is unclear which element has the so-called" the optical axis" as recited in the claim.
It is noted that while the specification has disclosed an alignment axis and an optical path; however, the specification has never disclosed any information related to the so-called "the optical axis". The only feature disclosed in the specification is related to an alignment axis (20), see page 2, line 8; page 3, lines 18-19; and page 4, lines 5-6, 12, 17 and 22. In page 2, on line 11-13, the specification discloses an optical path which is a light path defined by the tertiary mirror.

b) Claim 19 is rejected for the similar reason as set forth in element a) above.

c) The remaining claims are dependent upon the rejected base claims and thus inherit the deficiencies thereof.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1-3, 7-9 and 10, as best as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell et al in view of Draganov et al (both of record).

Wetherell et al disclose an optical device having a set of mirrors for imaging distant objects. The device is able to operate in a range of different wavebands including infrared waveband (see column 4, lines 53+). The off-axis three mirrors as described in columns 3-4 and shown in figures 3-4 comprises a concave primary mirror (31), a convex secondary mirror (32) and a concave tertiary mirror (33) wherein the primary mirror and the tertiary mirror share a common vertex and all mirrors share a common axis (34) and wherein the common vertex of the primary and tertiary mirrors is located in a hole/junction defined by the two mentioned mirrors and the vertex is located on the optical axis (34) of the three mirrors. It is noted that in column 4, lines 51+, Wetherell et al teach that the mirrors may be tilted or otherwise altered slightly from the rotational symmetry about the optical axis to achieve a desired level of image quality. The light from the distant object is guided to reflect on the three mirrors and then imaged onto the image plane (36) in which a sensor system is located (see column 3, lines 53+). The three mirrors with concave and convex configurations form an anastigmatic mirror system. The only feature missing from the system provided by Wetherell et al is that they do not disclose that the primary mirror and the tertiary mirror abut to one another as claimed.

However, the arrangement of a three mirror system in a manner that the primary mirror and the tertiary mirrors abut one another is suggested to one skilled in the art as can be seen in the system provided by Draganov et al. In particular, Draganov et al discloses a compact telescope having three mirrors (206, 204,

208). The telescope as described in columns 3-4 and shown in figure 2 comprises the following features: First, a primary mirror (206); a secondary mirror (204) and a tertiary mirror (208); Second, the primary and tertiary mirrors have a common vertex located at a junction/hole (210) defined by the primary and tertiary mirrors; Third, the primary mirror abuts the tertiary mirror; Fourth, the telescope has a common alignment axis (212) intersecting the vertex of the primary and tertiary mirror; and Fifth, the primary and tertiary mirrors are manufactured using diamond turning method from a single piece of equipment without realigning the equipment to obtain coincidental optical axes.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the telescope provided by Wetherell et al by arranging the primary mirror and the tertiary mirrors in an abut manner as suggested by Draganov et al for the purpose of reducing the time during the alignment of the mirrors.

10. Claims 11-13, 17, 19 and 20, as best as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell et al in view of Draganov et al.

Wetherell et al disclose an optical device having a set of mirrors for imaging distant objects. The device is able to operate in a range of different wavebands including infrared waveband (see column 4, lines 53+). The off-axis three mirrors as described in columns 3-4 and shown in figures 3-4 comprises a concave primary mirror (31), a convex secondary mirror (32) and a concave tertiary mirror (33) wherein the primary mirror and the tertiary mirror share a common vertex

and all mirrors share a common axis (34) and wherein the common vertex of the primary and tertiary mirrors is located in a hole/junction defined by the two mentioned mirrors and the vertex is located on the optical axis (34) of the three mirrors. It is noted that in column 4, lines 51+, Wetherell et al teach that the mirrors may be tilted or otherwise altered slightly from the rotational symmetry about the optical axis to achieve a desired level of image quality. The light from the distant object is guided to reflect on the three mirrors and then imaged onto the image plane (36) in which a sensor system is located (see column 3, lines 53+). The three mirrors with concave and convex configurations form an anastigmatic mirror system. The only feature missing from the system provided by Wetherell et al is that they do not disclose that the primary mirror and the tertiary mirror abut to one another as claimed.

However, the arrangement of a three mirror system in a manner that the primary mirror and the tertiary mirrors abut one another is suggested to one skilled in the art as can be seen in the system provided by Draganov et al. In particular, Draganov et al discloses a compact telescope having three mirrors (206, 204, 208). The telescope as described in columns 3-4 and shown in figure 2 comprises the following features: First, a primary mirror (206); a secondary mirror (204) and a tertiary mirror (208); Second, the primary and tertiary mirrors have a common vertex located at a junction/hole (210) defined by the primary and tertiary mirrors; Third, the primary mirror abuts the tertiary mirror; Fourth, the telescope has a common alignment axis (212) intersecting the vertex of the

primary and tertiary mirror; and Fifth, the primary and tertiary mirrors are manufactured using diamond turning method from a single piece of equipment without realigning the equipment to obtain coincidental optical axes.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the telescope provided by Wetherell et al by arranging the primary mirror and the tertiary mirrors in an abut manner as suggested by Draganov et al for the purpose of reducing the time during the alignment of the mirrors.

While the combined product as provided by Wetherell et al and Draganov et al does not clearly set forth a method for making their three-mirror system; however, it would have been obvious to one skilled in the art at the time the invention was made to set forth a set of steps including the step of preparing three mirrors in an order for imaging light from distant objects to a sensor system disposed at the image plane of the three mirrors arranged in such an order, and the step of employing the vertex common to the primary and tertiary mirrors at a junction of the mentioned mirrors at their junction which is located on the optical axis/rotational symmetric axis of the three mirrors, and tilting any mirror as necessary to achieve a desired level of image quality.

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell et al in view of Draganov et al as applied to claim 11 above and further in view of Pinson (of record).

The optical device having three mirrors wherein the primary mirror and the tertiary mirror share a common vertex and all mirrors share a common axis as provided by Wetherell et al and Draganov et al does not disclose that the secondary mirror is able to move for the purpose of focusing. However, the use of an optical device having a primary system and a secondary system for receiving and guiding light from an object to a receiving system wherein either the receiving system or the secondary system is moved for the purpose of focusing is known to one skilled in the art as can be seen in the optical device provided by Pinson. In particular, in column 3 and claim 3, Pinson discloses the movement of the secondary mirror for the purpose of adjusting the focus of the system. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the optical system provided by Wetherell et al and Draganov et al by moving the secondary mirror as suggested by Pinson for the purpose of focusing.

Response to Arguments

12. Applicant's arguments with respect to claims 1-3, 5-13 and 15-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

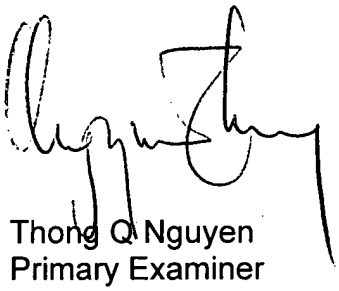
13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thong Q. Nguyen whose telephone number is (571) 272-2316. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A. Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thong Q Nguyen
Primary Examiner
Art Unit 2872

***